

1 **TRANSLATION OF THE INTERNATIONAL PATENT APPLICATION**
 AS PUBLISHED

URINAL

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The invention relates to a urinal comprising a dish, which forms a urinal basin with a drain passage in its bottom, and a syphon trap connected to the drain passage.

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In conventional urinals, the dish of which is typically configured for being mounted to a wall, the syphon trap is arranged directly below the urinal basin, so that it is difficult to get access to the same during mounting and maintenance works.

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For minimizing the consumption of fresh water, waterless urinals are increasingly employed in place of water-flushed urinals, same embodiments of the waterless urinals comprising a trap liquid that has a smaller specific weight than water and remains in the syphon trap. These waterless syphon traps must however be exchanged or at least serviced from time to time, for example by exchanging the trap liquid, or evaporation losses must be replaced. Since, consequently, the syphon trap should be readily accessible, it has heretofore been arranged directly in the bottom of the urinal basin in a countersunk fashion. This, however, has the drawback that the cover of the syphon trap, which is typically made of plastics, is visible in the urinal basin and forms a joint with the ceramics of the urinal basin, which joint is ugly and difficult to clean.

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It is therefore an object of the invention to provide a urinal wherein the syphon trap is arranged to be hidden and nevertheless easy to maintain.

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According to the invention, this object is achieved by that the dish forms an essentially vertical wall which separates the urinal basin from a chamber arranged behind the same, and by that the syphon trap is arranged in this chamber to be accessible from above.

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In the urinal according to the invention, the drain passage passes from the bottom of the urinal basin slantingly through the vertical wall into the cham-

1 ber which accommodates the syphon trap. Thus, the syphon trap is hidden
behind the vertical wall. Nevertheless, the syphon trap can readily be ac-
cessed during maintenance works. In order to get access to the syphon trap,
it is only necessary to remove a top cover of the chamber arranged behind the
5 urinal basin, so that the syphon trap can be accessed from above. Thus, in
case of a waterless syphon trap, the syphon trap may itself have a conven-
tional construction and may be withdrawn upwardly by means of a key that
is engaged in the cover in bayonet fashion.

10 Useful embodiments and further developments of the invention are indicated
in the dependent claims.

The vertical wall, which separates the urinal basin from the chamber accom-
modating the syphon trap, preferably has an approximately half-cylindrical
15 shape, so that it bulges convexly into the urinal basin. The chamber, which
may be either open or closed at the rear side facing the building wall, thus
has the shape of a vertical, approximately half-cylindrical wall and is prefe-
rably closed by a detachable lid at both, its top end and its bottom end,
which facilitates not only the access to the syphon trap but also the process
20 of mounting the urinal basin to the wall. The convexly curved shape of the
vertical wall has the further advantage that the urine jet impinging on the
wall will better be diffused, and back-splashing of urine is minimized. Moreo-
ver, it is possible thanks to this shape of the vertical wall to achieve a design
of the dish, as a hole, which has essentially no undercuts, so that the dish
25 can also be molded from plastic materials and can readily be removed from
the mold.

In waterless urinals, the invention has the further advantage that a forced
ventilation valve may be arranged on the syphon trap and will then be hidden
30 behind the vertical wall, so that it will not be visible when the urinal is used
and will not come into contact with urine, neither. The forced ventilation of
the syphon trap avoids an essential drawback of conventional waterless uri-
nals, which consists therein that a negative pressure in the piping system
will cause the trap liquid to be sucked-off. Thus, the forced ventilation also
35 reduces the consumption of trap liquid, and the trap liquid needs only to be
checked and/or replaced in larger intervals.

1 A scent agent may be added to the trap liquid in the syphon trap, so that
conventional scent stones in the urinal basin may be dispensed with. Since
the chamber accommodating the syphon trap is closed at the top, the scent
agent can essentially escape only through the drain passage or passages in
5 the bottom of the urinal basin, so that the discharge of the scent agent can
be controlled and dosed in a desirable way.

At the same time, the arrangement of the syphon trap in the largely closed
chamber will also minimize the evaporation losses of trap liquid and the pos-
10 sible generation of bad odours.

According to another advantageous embodiment of the invention, a larger
storage tank and an automatic dosing system for trap liquid and/or scent
agent may be arranged to be hidden in the chamber behind the urinal basin.
15 The automatic dosage of the liquid will further prolong the maintenance in-
tervals.

An embodiment example of the invention will now be described in conjunction
with the drawing, wherein:

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Fig. 1 is a front view of the urinal;

Fig. 2 is a side elevation of the urinal;

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Fig. 3 shows a top view of the urinal shown in figures 1 and 2;

Fig. 4 is a vertical section through the urinal mounted to a building
wall;

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Fig. 5 is an enlarged section through a syphon trap of the urinal;

Fig. 6 shows a top view of the syphon trap shown in figure 5; and

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Fig. 7 shows a vertical section through the urinal, analogous to Fig.
4, in a condition in which a cover of the syphon trap is remo-
ved.

1 The urinal shown in Figs. 1 to 4 comprises a dish 10, which is adapted to be
mounted to a wall and is preferably formed in one piece from plastics by in-
jection molding. The dish 10 forms a vertical, convexly curved wall 12 and a
urinal basin 14 projecting from the convex front side of the wall 12. The wall
5 12, together with a building wall 16 (Fig. 4) to which the urinal 10 is moun-
ted, forms an approximately half-cylindrical chamber 18 which is bevelled at
the top and bottom ends in such a manner that it tapers towards the front,
and which accommodates a waterless syphon trap 20. The top and bottom
openings of the chamber 18 are closed by detachable lids 22, 24. As is shown
10 in Fig. 3, the bottom of the urinal basin 14 is formed with several small drain
passages 26 which pass slightly slantingly through the wall 12 and open-out
directly above the syphon trap 20. Fig. 4 further shows a drain pipe 28 dispo-
sed in the building wall 16 and connected to the syphon trap 20. In the
example shown, the syphon trap is detachably suspended in an intermediate
15 floor 30 that is horizontally arranged in the chamber 18 and integrally con-
nected to the wall 12. A pot 30a, which accommodates the syphon trap 20 is
formed integrally with the intermediate floor 30. A rear wall 31 projects from
the intermediate floor 30 and extends to a higher level than the "mouth" of
the urinal basin and, together with the intermediate floor 30 and the curved
20 wall 12, forms a closed tub. If the drain pipe 28 is blocked, the urine will
thus not flow down along the building wall 16 within the chamber 18, but will
flood forwardly from the urinal basin.

In Fig. 5, the syphon trap 20 inserted into the pot 30a has been shown in an
25 enlarged section. The pot 30a forms a connector 30b for the drain pipe 28.
The syphon trap 20 is composed of three plastic members that are connected
to one another by ultrasonic welding, namely: a pot-shaped flood vessel 32, a
cylindrical insert 34 inserted into the flood vessel 32, and a cover 36 placed
on top of the flood vessel 32 and having the shape of a flat funnel. A flood
30 tube 38 projecting from the bottom of the flood vessel 32 has its open lower
end aligned with the connector 30b. The insert 34 has a separating wall 40
which extends vertically in the top portion and slightly inclined in the lower
portion and ends with its lower edge in a distance above the bottom of the
flood vessel 32 and passes diametrically through the cylindrical insert 34.
35 The cover 36 is fitted in the top opening of the flood vessel 32 with a periph-
eral collar and seals the flood vessel liquid-tightly. Further, the cover 30 is
liquid-tightly engaged with the top portion of the separating wall 40 through

1 two parallel flanges 42. The flood vessel 32 has a peripheral flange near its
top edge and is suspended in the intermediate floor 30 in such a manner that
the funnel-shaped cover 36 is flush with the top side of the intermediate floor
30. At its lowest position, the cover 36 has a central bore 44 which is sur-
5 rounded by three perforations 46 that are arranged with uniform angular
spacings and of which only one is visible in Fig. 5 (compare Fig. 6).

The drain passage 26 of the urinal basin 14 opens directly above the top side
of the cover 36. The cover forms a limiting wall 48 which is U-shaped in plan
10 view and encompasses the perforations 46 and is sealingly adjoined to the
vertical wall 12 of the dish 10 with its parallel legs. Outside of the limiting
wall 48, the cover 36 is formed with a plug connector 50 for a forced ventila-
tion valve 51. The valve 51 is mounted on a detachable floor 52 that rests on
the limiting wall 48.

15 The urine flows through the drain passage 26 over the cover 36 and through
the perforations 46 thereof into the flood vessel 32 and fills the same up to
the height of the flood tube 38. The separating wall 40 separates the flood
tube 38 from a trap volume that contains a trap liquid F that has a lower
20 specific weight than urine. The meniscus between the trap liquid F and the
urine is indicated in Fig. 5 by a chain line and is (because of the weight of the
trap liquid) slightly lower than the top end of the flood tube 38 and the level
of urine therein. Urine that is freshly supplied via the perforations 46 sinks
downwardly through the trap liquid, so that, according to the principle of
25 communicating tubes, the level of the urine in vicinity of the flood tube 38
will also be increased and the urine will flood into the flood tube 38 and then
be drained through the drain pipe 28.

If, for any reason, a low pressure occurs in the drain pipe 28, the forced ven-
30 tilation valve 51 will open, and the space of the flood vessel above the flood
tube 38 will be ventilated. This prevents urine and trap liquid from being su-
cked out of the flood vessel.

Small amounts of trap liquid may evaporate through the perforations 46.
35 However, this evaporation will essentially be stopped when the chamber 18
above the syphon trap 20 is saturated with vapour of the trap liquid. Only

1 very small amounts of trap liquid, to which a scent agent is preferably added,
may evaporate through the drain passage 26.

5 In the shown embodiment, in order to replace even the small evaporation losses of trap liquid, a storage tank 54 for trap liquid and/or a liquid scent agent is suspended in the chamber 18, and the liquid from this storage tank will gradually be dripped onto the cover 36 via a tube 56 and a metering valve 58.

10 When the cover 36 is sealed at the intermediate floor 30, it may also be admitted that, when the metering valve 58 is opened too far, the level 60 of the trap liquid raises beyond the cover 36, as is indicated in chain lines in Fig. 5. In this case, however, the evaporation rate will decrease, so that the level of the liquid will be stabilized. This has also the desirable effect that a larger
15 amount of scent agent will enter into the urinal basin 14 through the drain passage 26. In this case, the limiting wall 48 will prevent the trap liquid from flowing off over the intermediate floor 30.

Figure 6 shows the limiting wall 48 and the perforations 46 in plan view.

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When the syphon trap is to be exchanged, the top lid 22 of the chamber 18 and the floor 52 are removed, so that the syphon trap 20 will be accessible. Then, in a known manner, a key 62 (Fig. 7) that is suitably adapted to the shape of the perforations 46 is inserted into the perforations 46 from above
25 and, by being rotated slightly, is locked in bayonet fashion, so that the cover 36 and, with it, the whole syphon trap can be withdrawn upwardly from the pot 30a. In an alternative embodiment, only the cover 36 of the syphon trap may be removable.

30 Fig. 7 illustrates how the syphon trap 20 is withdrawn upwardly by means of the above-mentioned key 62. In the example shown, the key 62 has a joint 64 and a lever 66 at its top end. When, due to contaminants, the syphon trap has become locked in the opening of the intermediate floor 30 and is therefore difficult to detach, the lever 66 may be supported on the top edge of the
35 vertical wall 12 of the dish 10, so that the syphon trap may be lifted with leverage-increased force.